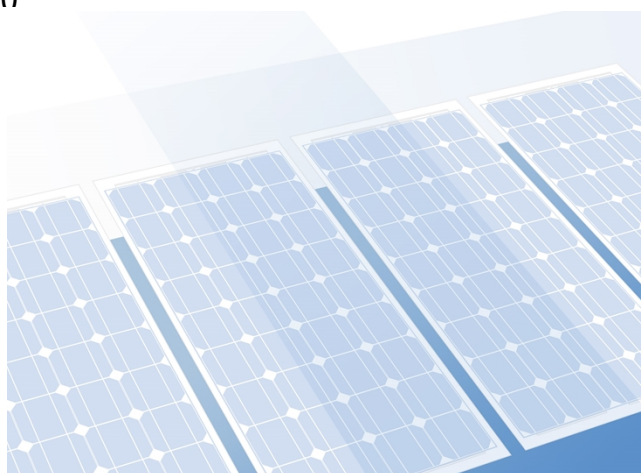


Project Name: Samtredia House of Justice

1/20/2020

ქსელური მზის ელექტროსადგური სამტრედიის იუსტიციის სახლი

სამტრედიის იუსტიციის სახლის პროექტი



პროექტის მიმოხილვა

მზის ელ. სადგურის სისტემა

ქსელზე დაერთებული

კლიმატის მონაცემები	Samtredia, GEO (1991 - 2010)
მზის ელ. სადგურის სიმძლავრე	26.88 kWp
მზის ელ. სადგურის მოცულობა	139.7 m ²
პანელების რაოდენობა	84
ინვერტორის რაოდენობა	1

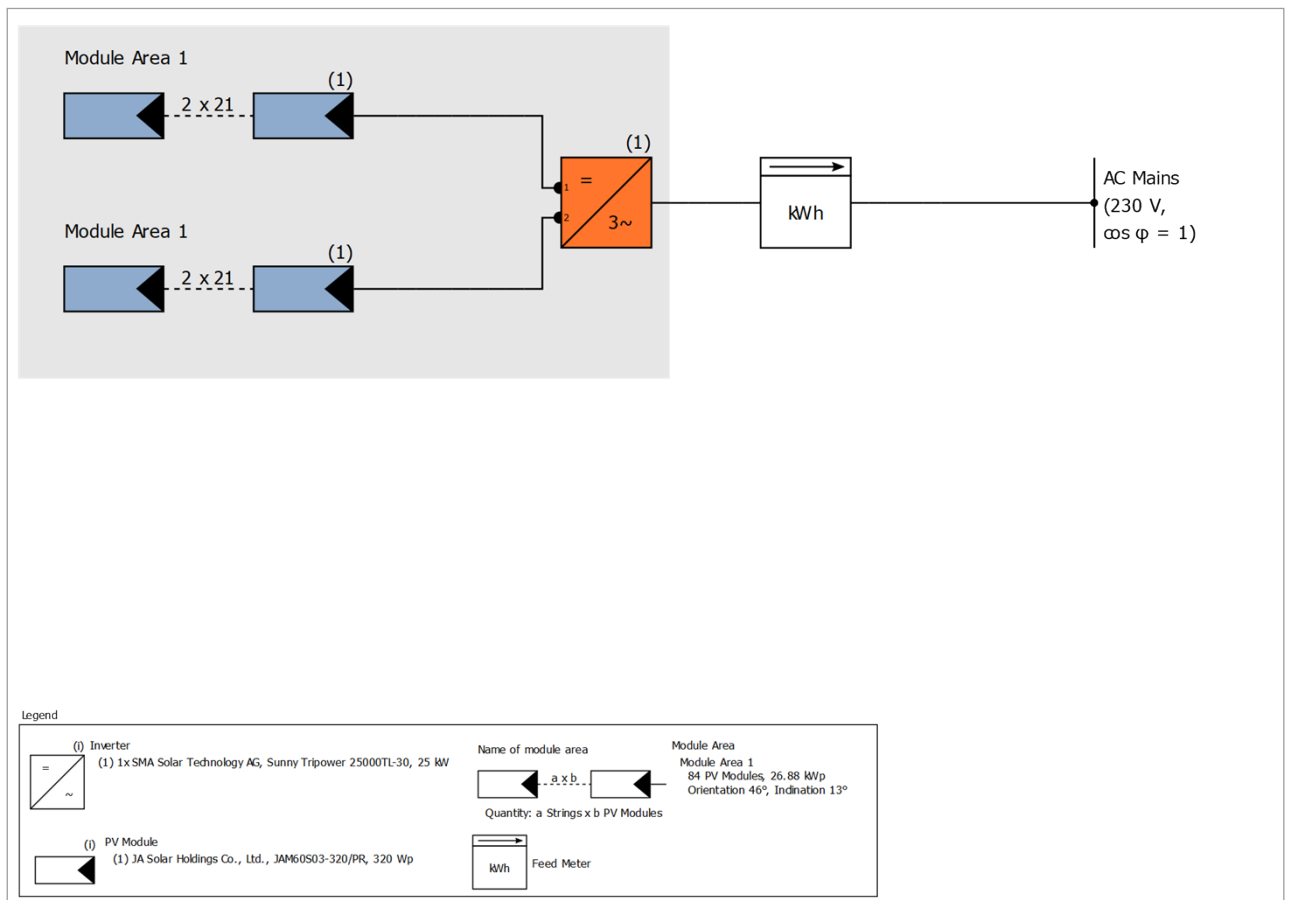


Figure: Schematic diagram

გამომუშავება

The yield

სადგურის წლიური გამომუშავება (AC grid)	27,208 kWh
ქსელში გამწვებული ენერგია	27,208 kWh
	0 kWh
Own Power Consumption	0.0 %
Solar Fraction	0.0 %
ერთი კვტ დადგმული სიმძლავრის წლიური გამომუშავება	1,012.19 kWh/kWp
მარგი ქმედების კოეფ.	87.0 %
თავიდან აცილებული CO ₂	16,325 kg / year

სისტემის მოწყობა მიმოხილვა

System Data

Type of System	Grid-connected PV System
Start of Operation	9/25/2019

Climate Data

Location	Samtredia, GEO (1991 - 2010)
Resolution of the data	1 h
Simulation model used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

სახურავი N 3

მზის პანელების განთავსების მონაცემები

PV Generator, 1. Module Area - Module Area 1

Name	Module Area 1
PV Modules/მზის პანელები	84 x Watt-320/PR
Manufacturer/მწარმოებელი	-----
Inclination/დახრა	13 °
Orientation/მიმართულება	Northeast 46 °
Installation Type/ინსტალაციის ტიპი	Roof parallel
PV Generator Surface/სადგურის მოცულობა	139.7 m ²

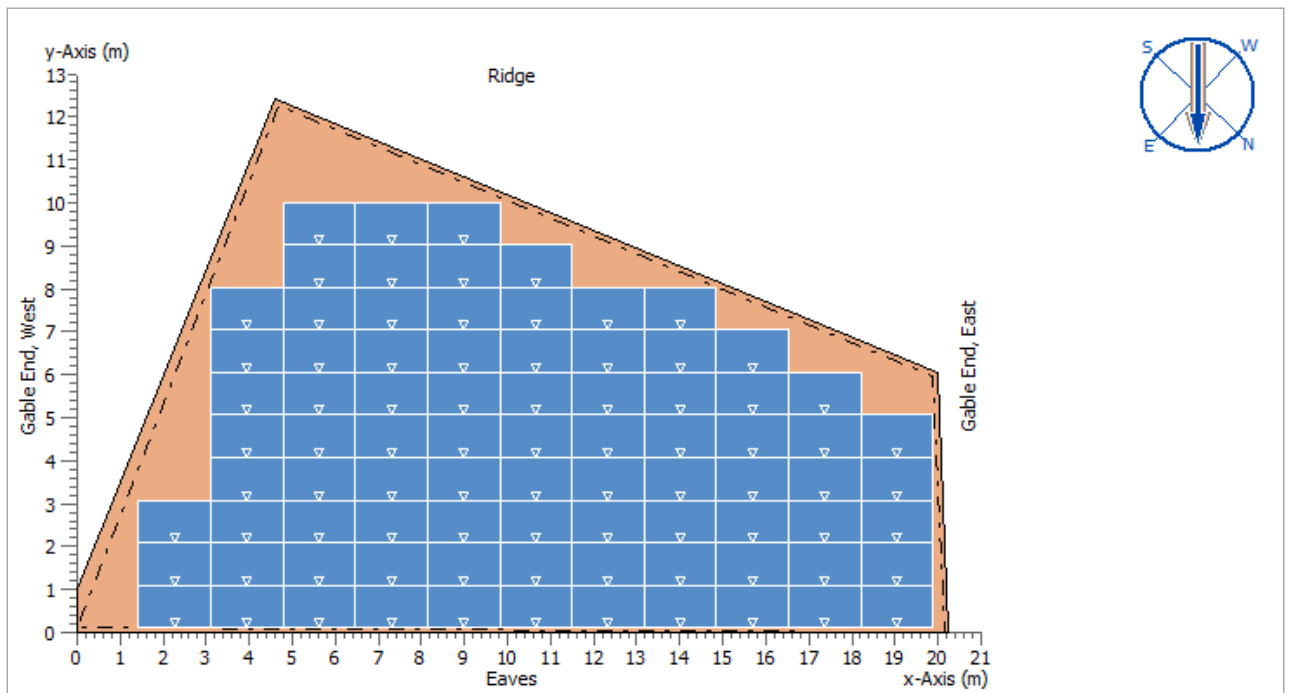


Figure: Roof Layout, 1. Module Area - Module Area 1

Shading, 1. Module Area - Module Area 1

Shading	0 %
---------	-----

Inverter configuration

Configuration 1

Module Area	Module Area 1
Inverter 1	
Model	
Quantity	1
Sizing Factor	107.5 %
Configuration	MPP 1: 2 x 21
	MPP 2: 2 x 21

AC Mains

AC Mains

Number of Phases	3
Mains Voltage (1-phase)	230 V
Displacement Power Factor (cos phi)	+/- 1

სამტრედიის იუსტიციის სახლის მხის ელ. სადგურის გამომუშავების პროგნოზი, სახურავი N 3

PV System

PV Generator Output	26.9 kWp
Spec. Annual Yield	1,012.19 kWh/kWp
Performance Ratio (PR)	87.0 %
Grid Feed-in	27,208 kWh/year
Grid Feed-in in the first year (incl. module degradation)	27,208 kWh/year
Standby Consumption (Inverter)	15 kWh/year
CO ₂ Emissions avoided	16,325 kg / year

Energy Flow Graph

Project: Samtredia House of Justice



All values in kWh
Small deviations in the totals can occur due to rounding
created with PV*SOL

Figure: Energy Flow Graph

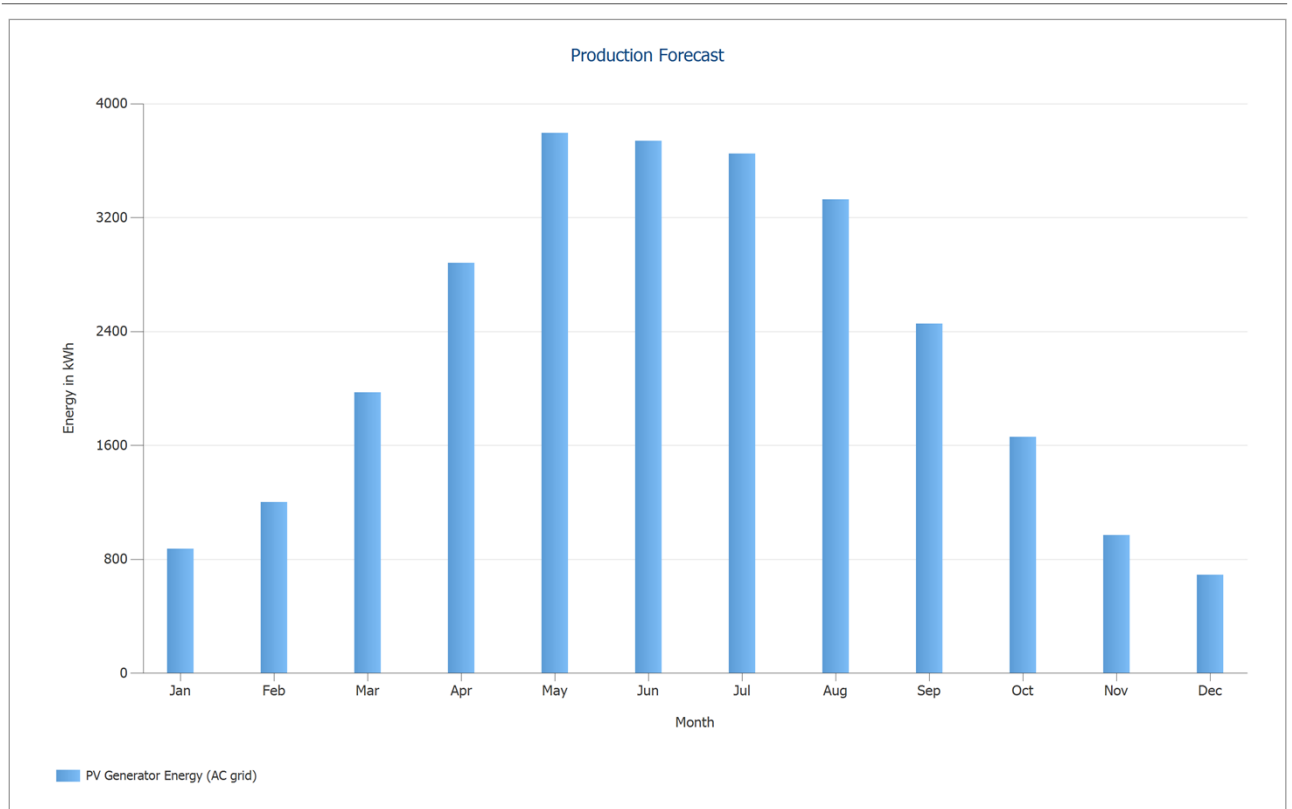


Figure: Production Forecast

PV System Energy Balance

PV System Energy Balance

Global radiation - horizontal	1,296.53 kWh/m²	
Deviation from standard spectrum	-12.97 kWh/m ²	-1.00 %
Ground Reflection (Albedo)	3.29 kWh/m ²	0.26 %
Orientation and inclination of the module surface	-124.25 kWh/m ²	-9.66 %
Shading	0.00 kWh/m ²	0.00 %
Reflection on the Module Interface	-33.55 kWh/m ²	-2.89 %
Global Radiation at the Module	1,129.05 kWh/m²	
	1,129.05 kWh/m ²	
	x 139.68 m ²	
	= 157,709.85 kWh	
Global PV Radiation	157,709.85 kWh	
Soiling	0.00 kWh	0.00 %
STC Conversion (Rated Efficiency of Module 19.25 %)	-127,354.87 kWh	-80.75 %
Rated PV Energy	30,354.99 kWh	
Low-light performance	-605.70 kWh	-2.00 %
Deviation from the nominal module temperature	-836.12 kWh	-2.81 %
Diodes	-144.57 kWh	-0.50 %
Mismatch (Manufacturer Information)	-575.37 kWh	-2.00 %
Mismatch (Configuration/Shading)	0.00 kWh	0.00 %
PV Energy (DC) without inverter down-regulation	28,193.23 kWh	
Failing to reach the DC start output	-9.90 kWh	-0.04 %
Down-regulation on account of the MPP Voltage Range	0.00 kWh	0.00 %
Down-regulation on account of the max. DC Current	0.00 kWh	0.00 %
Down-regulation on account of the max. DC Power	0.00 kWh	0.00 %
Down-regulation on account of the max. AC Power/cos phi	0.00 kWh	0.00 %
MPP Matching	-92.22 kWh	-0.33 %
PV energy (DC)	28,091.11 kWh	
Energy at the Inverter Input	28,091.11 kWh	
Input voltage deviates from rated voltage	-76.78 kWh	-0.27 %
DC/AC Conversion	-670.02 kWh	-2.39 %
Standby Consumption (Inverter)	-14.83 kWh	-0.05 %
Total Cable Losses	-136.80 kWh	-0.50 %
PV energy (AC) minus standby use	27,192.68 kWh	
Grid Feed-in	27,207.59 kWh	

Data Sheets

PV Module Data Sheet

PV Module: Watt-320/PR

Manufacturer	-----
Available	Yes

Electrical Data

Cell Type	Si monocrystalline
Only Transformer Inverters suitable	No
Number of Cells	120
Number of Bypass Diodes	3

Mechanical Data

Width	991 mm
Height	1678 mm
Depth	35 mm
Frame Width	35 mm
Weight	18.5 kg
Framed	No

I/V Characteristics at STC

MPP Voltage	33.34 V
MPP Current	9.6 A
Nominal output	320 W
Open Circuit Voltage	40.22 V
Short-Circuit Current	10.16 A
Increase open circuit voltage before stabilisation	0 %

I/V Part Load Characteristics

Values source	Manufacturer/user-created
Irradiance	200 W/m ²
Voltage in MPP at Part Load	32.49 V
Current in MPP at Part Load	1.95 A
Open Circuit Voltage (Part Load)	36.64 V
Short Circuit Current at Part Load	2.16 A

Further

Voltage Coefficient	-116.24 mV/K
Electricity Coefficient	5.18 mA/K
Output Coefficient	-0.36 %/K
Incident Angle Modifier	98 %
Maximum System Voltage	1000 V
Spec. Heat Capacity	920 J/(kg*K)
Absorption Coefficient	70 %
Emissions Coefficient	85 %

Inverter Data Sheet

Inverter: -----

Manufacturer	-----
--------------	-------

Available	Yes
-----------	-----

Electrical Data

DC nominal output	25.55 kW
AC Power Rating	25 kW
Max. DC Power	25.55 kW
Max. AC Power	25 kVA
Standby Consumption	12.5 W
Night Consumption	1 W
Feed-in from	84 W
Max. Input Current	66 A
Max. Input Voltage	1000 V
Nom. DC Voltage	600 V
Number of Feed-in Phases	3
Number of DC Inlets	6
With Transformer	No
Change in Efficiency when Input Voltage deviates from Rated Voltage	-0.49 %/100V

MPP Tracker

Output Range < 20% of Power Rating	97 %
Output Range > 20% of Power Rating	100 %
No. of MPP Trackers	2
Max. Input Current per MPP Tracker	33 A
Max. Input Power per MPP Tracker	25.55 kW
Min. MPP Voltage	150 V
Max. MPP Voltage	800 V

Plans

Roof Plan

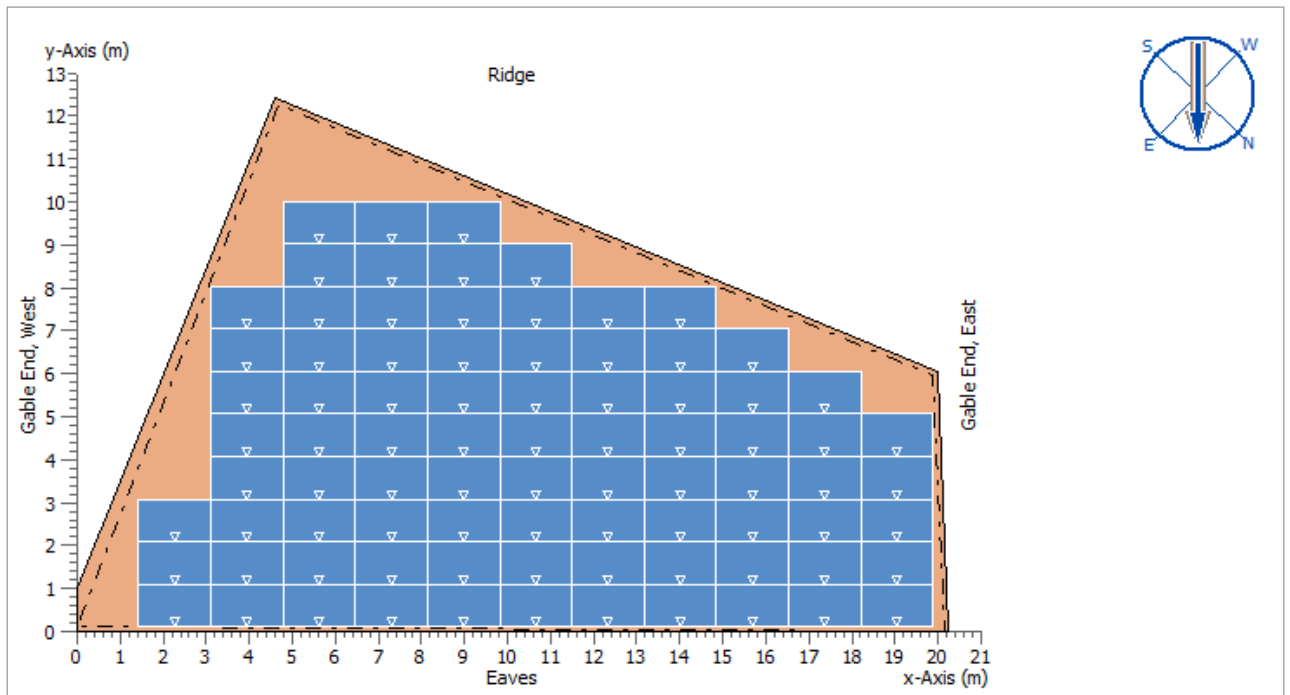


Figure: Roof Layout, 1. Module Area - Module Area 1

წრედის დიაგრამა

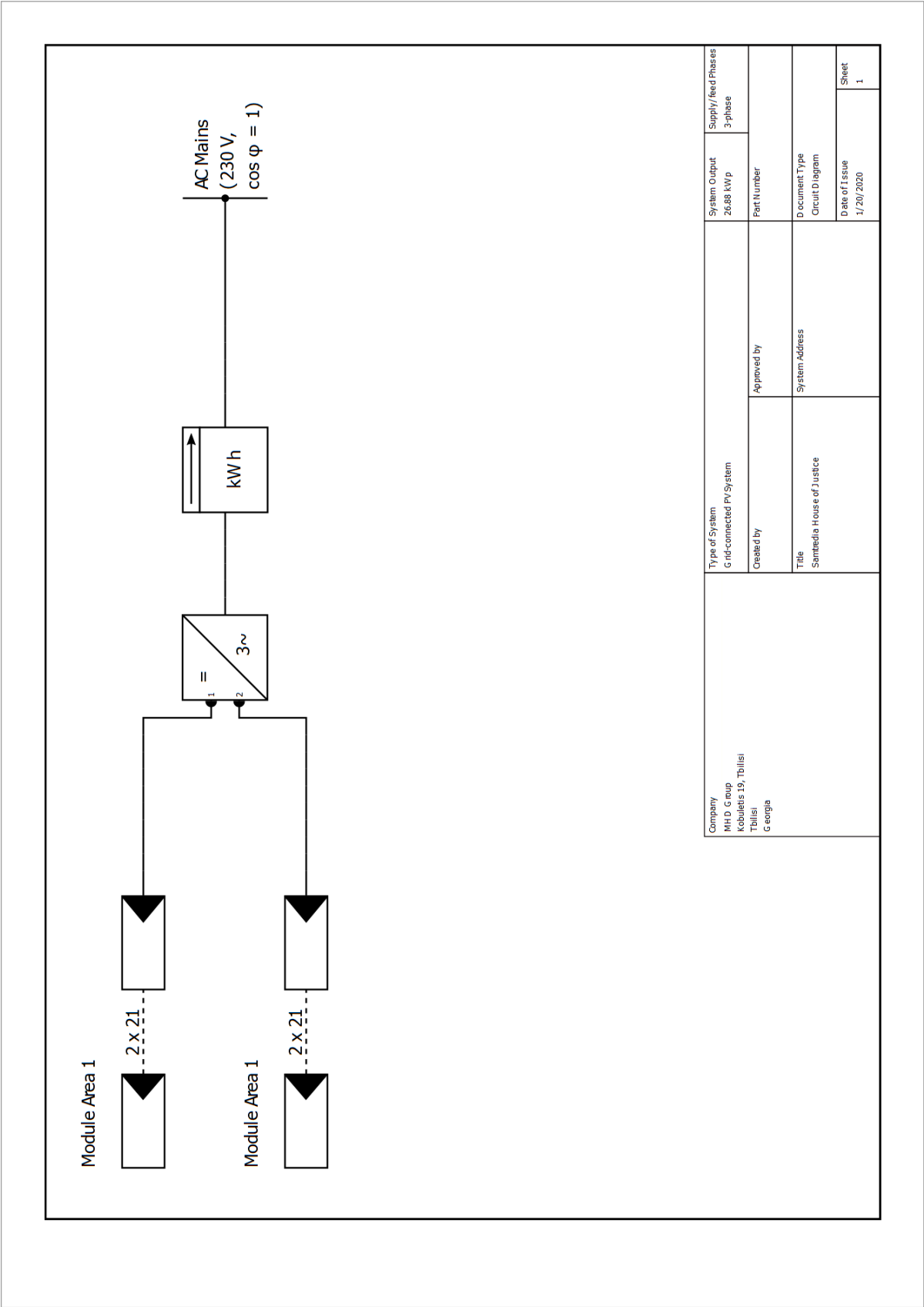


Figure: Circuit Diagram